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BENTON HARBOR, MICHIGAN

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PRICE \$1.00

Heathkit

VIBRATOR
POWER SUPPLY
MODEL VP-1-12

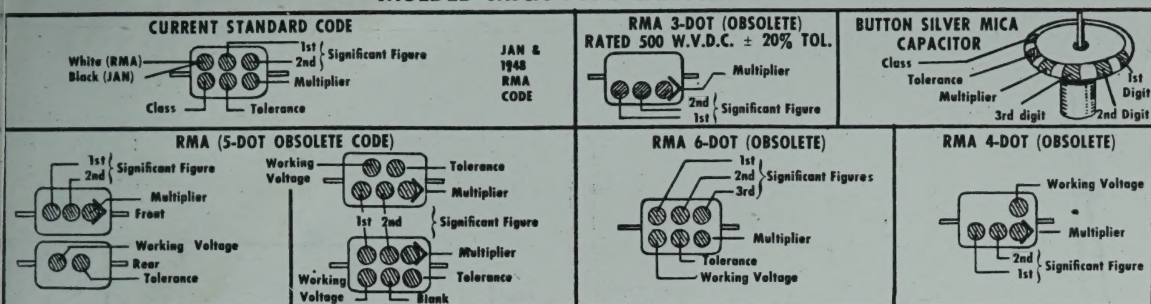
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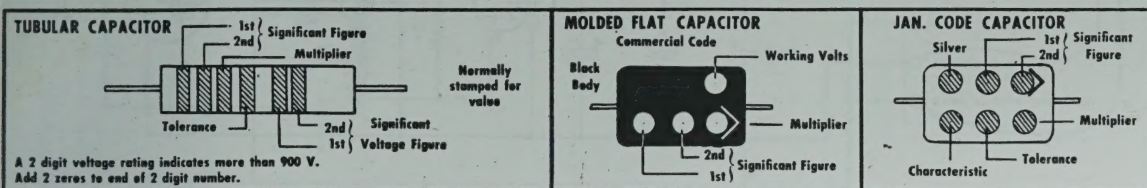
BENTON HARBOR, MICHIGAN

505-149

MOLDED MICA TYPE CAPACITORS



MOLDED PAPER TYPE CAPACITORS

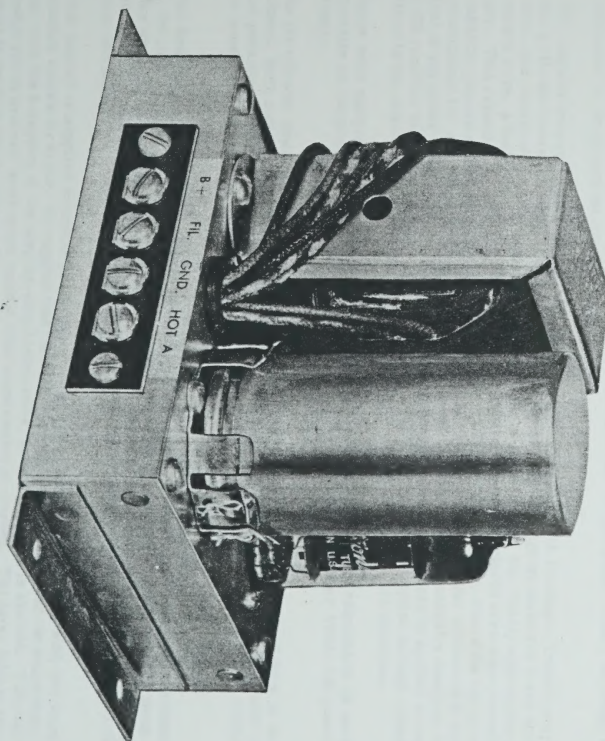


The tolerance rating of capacitors is determined by the color code. For example: red = 2%, green = 5%, etc. The voltage rating of capacitors is obtained by multiplying the color value by 100. For example: orange = 3×100 or 300 volts. Blue = 6×100 or 600 volts.

In the design of Heathkits, the temperature coefficient of ceramic or mica capacitors is not generally a critical factor and therefore Heathkit manuals avoid reference to temperature coefficient specifications.

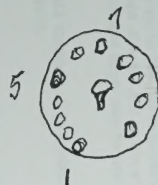
Courtesy of Controlab

ASSEMBLY AND OPERATION OF THE HEATHKIT VIBRATOR POWER SUPPLY MODEL VP-1-12



SPECIFICATIONS

Power Input: 12 volts DC at 2.25 amperes maximum
 Power Output: 250 volts DC at 0.06 amperes
 Tube Complement: 1 - 12X4 rectifier
 Frequency: 115 cps, ± 7 cps nominal
 Overall size: 4 1/4" high x 4" wide x 3 7/8" deep
 Net Weight: 2 3/4 pounds
 Shipping weight: 4 pounds



UNPACK THE KIT CAREFULLY AND CHECK EACH PART AGAINST THE PARTS LIST. In so doing, you will become acquainted with the parts. Refer to the charts and other information shown on the inside covers of your manual to help you identify the components. If some short-
age or parts damage is found in checking the Parts List, please read the REPLACEMENT section and supply the information called for therein, and include all inspection slips in your letter-
us. Hardware items are counted by weight and there may be a few more or less than the quantity specified. A few are missing, please obtain them locally if at all possible.

In order to expedite delivery to you, we are occasionally forced to make minor substitutions of components. Such substitutions are carefully checked in our laboratories before being approved and the components supplied will operate satisfactorily. By checking the parts list for resistors, for example, you may find that a 5.6 K Ω resistor has been supplied in place of a 4.7 K Ω as shown in the parts list. These possible changes are self-evident and are mentioned here only to prevent confusion in checking the contents of your kit.

We strongly urge that you follow the wiring and parts layout shown in this manual. The instrument will be simpler to construct if the instructions are followed precisely.

NOTES ON WIRING

Read the notes on soldering and wiring on the inside rear cover. Crimp all leads tightly to the terminal before soldering. Be sure both the lead and terminal are free of wax, corrosion or other foreign substances. Use only the best rosin core solder, preferably a type containing the new activated fluxes such as Kester "Radio-TV Solder," Erskin "Multicore" or similar types.

Unless otherwise indicated, all wire used is insulated. Wherever there is a possibility of the bare leads on resistors and capacitors shorting to other parts or to chassis, the leads should be covered with insulated sleeving. This is indicated in the instructions by the phrase "use sleeving." Bare wire is used where the lead lengths are short and the possibility of short circuits are non-existent.

Leads on resistors, capacitors and transformers are generally much longer than they need to be to make the indicated connections. In these cases, the excess leads should be cut off before the part is added to the chassis. In general, the leads should be just long enough to reach their terminating points. Not only does this make the wiring much neater but in many instances, the excessively long leads will actually interfere with proper operation of the instrument.

The pictorials indicate actual chassis wiring and designate values of the component parts. We very strongly urge that the chassis layout, lead placement and grounding connections be followed exactly as shown. While the arrangement shown is probably not the only satisfactory layout, it is the result of considerable experimentation and trial. If followed carefully, it will result in a stable instrument operating at a high degree of accuracy and dependability.

Space has been provided for you to check off each operation as it is completed. This is particularly important in wiring and it may prevent omissions or errors, especially where your work is interrupted frequently as the wiring progresses. Some kit builders have also found it helpful to mark each lead in colored pencil on the pictorial as it is added.

The abbreviation (NS) indicates that the connection should not be soldered as yet, for other wires will be added. When the last wire is installed, the terminal should be soldered and the abbreviation (S) is used to indicate this.

PROPER SOLDERING PROCEDURE

Only a small percentage of Heathkit purchasers find it necessary to return an instrument for factory service. Of these, by far the largest proportion function improperly due to poor or improper soldering.

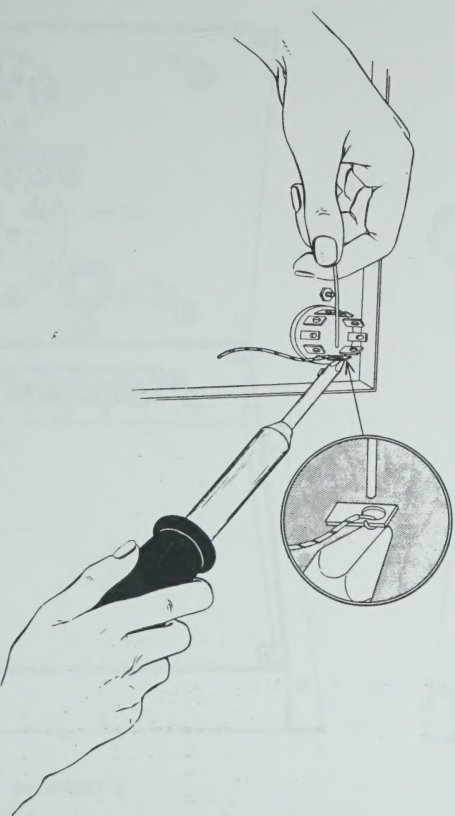
Correct soldering technique is extremely important. Good solder joints are essential if the performance engineered into the kit is to be fully realized. If you are a beginner with no experience in soldering, a half-hour's practice with odd lengths of wire and a tube socket will be a worthwhile investment.

High quality solder of the proper grade is most important. There are several different brands of solder on the market, each clearly marked "Rosin Core Radio Solder." Such solders consist of an alloy of tin and lead, usually in the proportion of 50:50. Minor variations exist in the mixture such as 40:60, 45:55, etc. with the first figure indicating the tin content. Radio solders are formed with one or more tubular holes through the center. These holes are filled with a rosin compound which acts as a flux or cleaning agent during the soldering operation.

NO SEPARATE FLUX OR PASTE OF ANY KIND SHOULD BE USED. We specifically caution against the use of so-called "non-corrosive" pastes. Such compounds, although not corrosive at room temperatures, will form residues when heated. The residue is deposited on surrounding surfaces and attracts moisture. The resulting compound is not only corrosive but actually destroys the insulation value of non-conductors. Dust and dirt will tend to accumulate on these "bridges" and eventually will create erratic or degraded performance of the instrument.

NOTE: ALL GUARANTEES ARE VOIDED AND WE WILL NOT REPAIR OR SERVICE INSTRUMENTS IN WHICH ACID CORE SOLDER OR PASTE FLUXES HAVE BEEN USED. WHEN IN DOUBT ABOUT SOLDER, IT IS RECOMMENDED THAT A NEW ROLL PLAINLY MARKED "ROSKIN CORE RADIO SOLDER" BE PURCHASED.

If terminals are bright and clean and wires free of wax, frayed insulation and other foreign substances, no difficulty will be experienced in soldering. Crimp or otherwise secure the wire (or wires) to the terminal, so a good joint is made without relying on solder for physical strength. To make a good solder joint, the clean tip of the soldering iron should be placed against the joint to be soldered so that the terminal is heated sufficiently to melt solder. The solder is then placed against both the terminal and the tip of the iron and will immediately flow out over the joint. Refer to the sketch below. Use only enough solder to cover wires at the junction; it is not necessary to fill the entire hole in the terminal with solder. Excess solder may flow into the socket contacts, ruining the socket, or it may creep into switch contacts and destroy their spring action. Position the work so that gravity tends to keep the solder where you want it.



A poor solder joint will usually be indicated by its appearance. The solder will stand up in a blob on top of the connection, with no evidence of flowing out caused by actual "wetting" of the contact. A crystalline or grainy texture on the solder surface, caused by movement of the joint before it solidified, is another evidence of a "cold" connection. In either event, reheat the joint until the solder flows smoothly over the entire junction, cooling to a smooth, bright appearance. Photographs in the adjoining picture clearly indicate these two characteristics.

A good, clean, well-tinned soldering iron is also important to obtain consistently perfect connections. For most wiring, a 60 or 100 watt iron, or the equivalent in a soldering gun, is very satisfactory. Smaller irons generally will not heat the connections enough to flow the solder smoothly over the joint and are recommended only for light work, such as on etched circuit boards, etc. Keep the iron tip clean and bright. A pad of steel wool may be used to wipe the tip occasionally during use.

Take these precautions and use reasonable care during assembly of the kit. This will insure the wonderful satisfaction of having the instrument operate perfectly the first time it is turned on.

STEP-BY-STEP ASSEMBLY INSTRUCTIONS

- (1) Lockwashers are used under all nuts except where a solder lug is used.
- (2) Lay out the chassis top plate as shown in Pictorial 1. The two socket holes should be to your left and the larger socket hole nearest you. The chassis is now upside down.
- (3) Mount the 7-pin miniature socket at A as shown, with the wide spacing to your right. See Figure 1. Use 3-48 hardware.

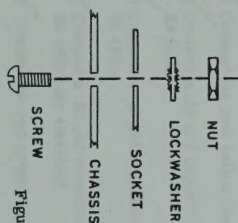


Figure 1

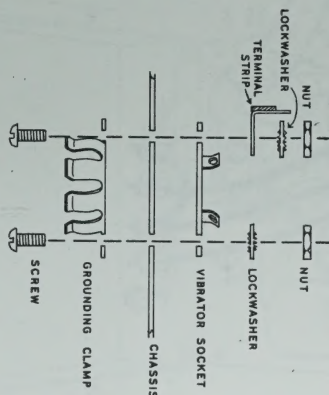


Figure 2

- (4) Mount the 4-pin vibrator socket and vibrator grounding clamp at B as shown in Figure 2. Use 6-32 x 3/4" BH screws and mount terminal strip E on the mounting screw nearest socket A. Note that both water sockets mount on the same side of the chassis, while the grounding clamp mounts on the reverse side (top). See Pictorial 1.

- (5) Insert the 1/2" rubber grommet at F.

- (6) Mount the power transformer on top of the chassis (same side as the vibrator ground clamp) using holes C and D. Use 8-32 hardware and use a solder lug instead of a lockwasher at C. Be sure the transformer is oriented so that the leads leave the transformer nearest grommet F. See Figure 3.

- (7) Feed all transformer leads through grommet F.

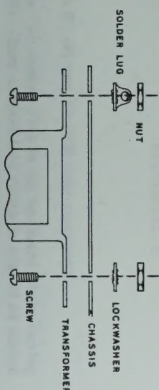
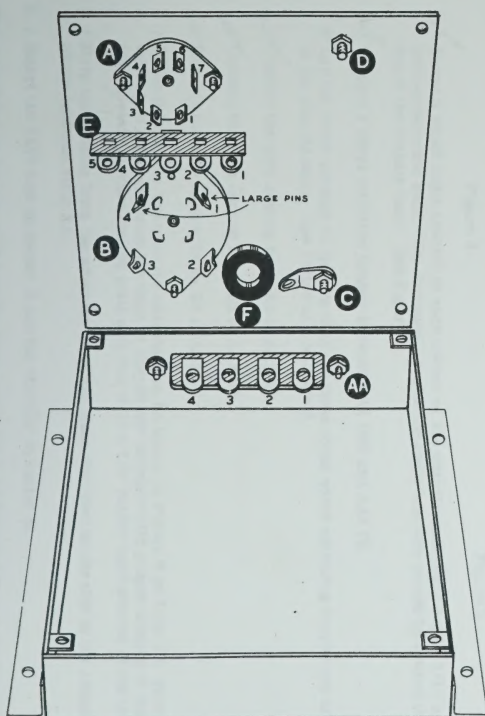
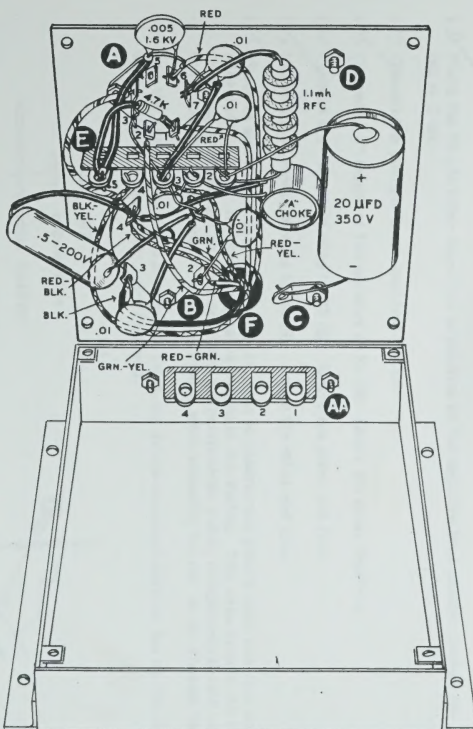


Figure 3



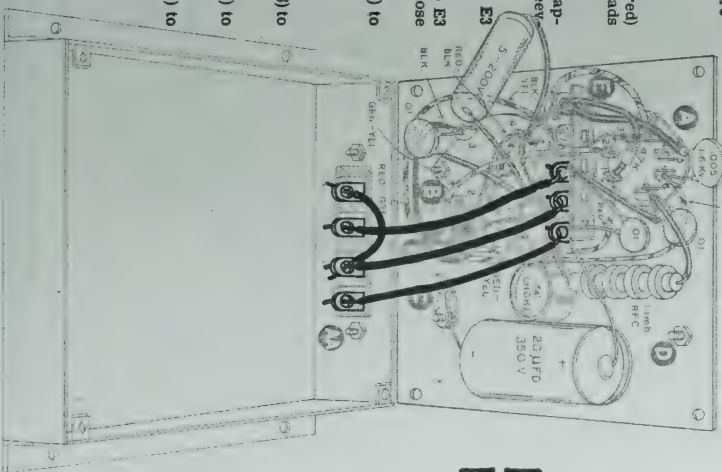
PICTORIAL 1



PICTORIAL 2

- (1) Cut one red lead to the proper length and connect to A6 (NS). Route this and all remaining leads as shown in Pictorial 2.
- (2) Connect the other red lead to A1 (NS).
- (3) Run a 4.7 K Ω resistor (yellow-violet-red) between A1 (S) and E5 (NS). Keep the leads short. Use sleeving.
- (4) Connect a .005 μ fd 1.6 kv disc ceramic capacitor between E5 (S) and A6 (S). Use sleeving.
- (5) Connect a bare wire from A3 (S) through E3 (NS) to B1 (NS).
- (6) Run a .01 μ fd capacitor from A7 (NS) to E3 (NS) (use sleeving). Lay this capacitor close to the chassis.
- (7) Connect a .01 μ fd capacitor from E1 (NS) to E3 (NS).
- (8) Connect the red-yellow lead to E3 (NS).
- (9) Connect a .01 μ fd capacitor from E2 (NS) to E3 (NS).
- (10) Connect a .01 μ fd capacitor from B2 (NS) to B1 (NS).
- (11) Connect a .01 μ fd capacitor from B3 (NS) to B1 (NS) (use sleeving).
- (12) Connect the red-green lead to E2 (S).
- (13) Connect the red-black lead to B4 (S).
- (14) Connect the black lead to B3 (S).
- (15) Connect the green lead to B4 (NS).
- (16) Connect the black-yellow lead to E4 (S).
- (17) Connect the green-yellow lead to A2 (S).
- (18) Run a wire from B4 (NS) to A4 (S).
- (19) Connect the .5 μ fd tubular capacitor between B1 (S) and B4 (NS) (use sleeving).
- (20) Slide a length of sleeving over one lead of the "A" choke. This is the enclosed choke having heavy wire leads. Connect this lead to B4 (S). Make certain this choke is placed as shown in Pictorial 2.
- (21) Bend the other lead of the "A" choke as shown and connect to E2 (NS).
- (22) Using 1" of sleeving, connect one lead of the 1.1 mh RF choke to A7 (S). Lay the choke out as shown in Pictorial 2, spacing it approximately 1/8" away from the chassis and connect the other lead to E1 (NS).

PICTORIAL 3



- (1) Place the 20 μ fd filter capacitor in position so the negative lead passes through the solder lug at C (S).
- (2) Connect the positive (red) lead to E1 (NS).
- (3) Connect a 4" length of hookup wire to E1 (S). Leave the other end free.
- (4) Connect a 4" length of wire to E2 (S). Leave the other end free.
- (5) Connect a 4" length of wire to E3 (S). Leave the other end free.
- (6) Check to see that all leads are soldered, that no inadvertent shorts exist and that no loose wire ends or other foreign material is lodged in the wiring. The area around the corner mounting holes should be clear of wiring and components and all components should be close to the chassis so that room will be available when mounting the unit in the chassis base.
- (7) Lay the chassis top aside and mount the 4-lug screw-terminal strip at AA on the chassis base using 6-32 hardware. See Figure 4.

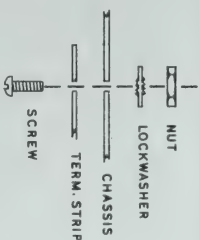


Figure 4

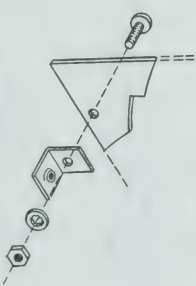


Figure 5

- (1) Mount a small angle bracket at each corner of the chassis base using 6-32 x 3/16 screws, lockwashers and nuts. The threaded holes in the angle brackets should be toward the open top of the chassis base. See Figure 5.
- (2) Connect a short insulated jumper between AA2 (NS) and AA4 (S).
- (3) Lay the wired chassis on its side with the three loose wires extending toward you and over to the chassis base. See Pictorial 3 on Page 8.
- (4) Connect the wire coming from E1 to AA1 (S).
- (5) Connect the wire coming from E2 to AA2 (S).
- (6) Connect the wire coming from E3 to AA3 (S).
- (7) Place the chassis top over the chassis base as shown in Figure 6 on Page 10, slowing the wires just attached inside the base so they do not interfere with proper seating of the chassis top plate. Secure the top plate with four 6-32 x 1/4" binder head screws at the corners.
- (8) Strip the backing from the adhesive label and place the label on the side of the chassis base above terminal strip AA.
- (9) Insert the 12X4 tube in socket A and the vibrator in socket B.

This completes construction of your Heathkit model VP-1-12 Vibrator Power Supply.

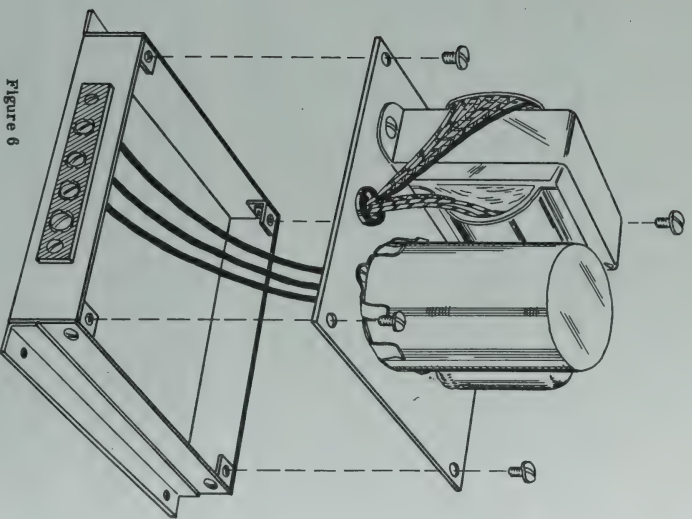


Figure 6

TESTING THE COMPLETED UNIT

It is assumed a source of DC voltage is available for testing, capable of delivering up to 2.3 amperes. An automobile storage battery or a battery eliminator-charger such as the Heathkit model BE-4 Battery Eliminator may be used. Do not attempt to use dry cell batteries as a primary power source, since the requirements exceed their capabilities.

A resistive load of 5000 Ω at 25 watts should be used for testing to simulate maximum loading of the equipment to be powered. This resistance should be temporarily connected between B+ (AA1) and ground (AA3).

Use #18 or larger leads and connect one terminal of the DC source to HOT A (AA4) and the other to GND. (AA3). No ground is necessary in most cases. However, if testing is done using a storage battery or other device already connected into other circuits, whichever terminal of the battery is ungrounded should be connected to HOT A (AA4) and the other to GND. (AA3). Assuming you have a proper source voltage of 12 volts DC and a 5000 Ω 25 watt load resistor, the DC voltage output between B+ and ground should be in the vicinity of 260 volts. Depending on many factors, this voltage may be anywhere between about 250 and 300 volts DC. As long as voltage across the 5000 Ω load resistor is in the vicinity of 250 volts or more, it may be assumed your power supply is operating correctly.

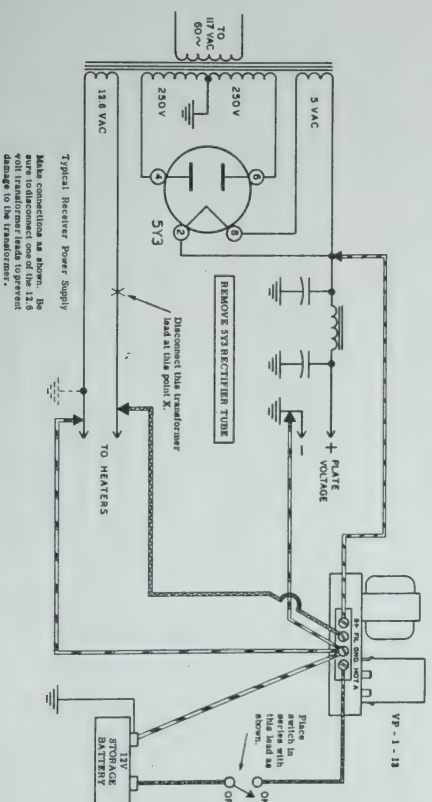
IN CASE OF DIFFICULTY

Check your wiring thoroughly. Better still, having a friend check the wiring will often disclose an error consistently overlooked. Except for the relatively remote possibility of a defective rectifier tube, vibrator or other component, the main cause for trouble in an instrument this simple is an inadvertent wiring error, unsoldered joint or short circuit.

OPERATION

Your Heathkit model VP-1-12 is designed as an accessory for emergency powering of many small electronic devices in mobile or other applications remote from the 110 volt AC power lines. It is designed to temporarily replace the usual 110 volt AC power supply in the equipment to be powered and unless an emergency power socket and its attendant connections is wired into the equipment, the internal power supply must be disconnected. This is most easily accomplished by removal of the rectifier tube so that operating voltage from the VP-1-12 may be applied between the rectifier socket cathode (or heater pin, where applicable) and chassis ground. 12 volts DC for heaters in the equipment may be taken directly from the battery or between the FTL (AA2) terminal and ground on the VP-1-12. Be sure to disconnect one of the transformer heater winding leads in the equipment to be powered. If the heater winding is left connected, it will rapidly destroy the transformer in the equipment you are using in conjunction with the VP-1-12. The vibrator power supply will not be damaged in this event, but your battery will be rapidly discharged. See the illustrations following for a more graphic presentation of this problem.

Four holes have been provided in the bottom of the chassis base for mounting your VP-1-12 to the floor, firewall, shelf or bulkhead. It may be mounted either on metal or other material such as wood or plastic and no shock mounting is necessary. It is recommended that where the VP-1-12 is to be fastened down securely, it be screwed to a horizontal surface so it will retain its normal operating position.



SERVICE

If, after applying the information contained in this manual and your best efforts on the unit, you are still unable to obtain proper performance from the instrument, it is suggested that you take advantage of the technical facilities which the Heath Company makes available to its customers.

The Technical Consultation Department is maintained for the purpose of providing Heath customers with a personalized technical consultation service; this service is available to you without charge. The technical consultants are thoroughly familiar with all details of the instrument and can usually localize the trouble from a suitable description of the difficulty encountered. It is, of course, necessary that you provide full and complete information concerning your problem when writing to the Technical Consultation Department for assistance. For instance, clearly identify the kit involved, giving the purchase date and, if possible, the invoice number; describe in detail the difficulty that you have encountered; state what you have attempted to do to rectify the trouble, what results have been achieved, and include any information or clues that you feel could possibly be of value to the consultant who handles your problem. Failure to provide complete descriptive details may lead to incorrect assumptions on the part of the consultant and needless delay in the solution to your problem. Quite frequently, when the information given the consultants is complete, concise and reliable, a diagnosis of the difficulty can be made with confidence and specific instructions given for its correction. If replacement of a component is involved in the correction, the component will be shipped to you, subject to the terms and conditions of the Warranty.

The Factory Service facilities are also available to you. In case you are not familiar enough with electronics to provide our consultants with sufficient information on which to base a diagnosis of your difficulty, or in the event that you prefer to have the difficulty corrected in this manner, you may return the completed instrument to the Heath Company for inspection and necessary repairs and adjustments. You will be charged a fixed fee of \$4.00, plus the price of any additional parts or material required. However, if the instrument is returned within the Warranty period, parts charges will be governed by the terms of the Warranty. State the date of purchase and give invoice number, if possible.

Local Service by Authorized Heathkit Dealers is also available and often will be your fastest, most efficient method of obtaining service for your Heathkits. Although you may find charges for local service somewhat higher than those listed in Heathkit manuals (for factory service), the amount of increase is usually offset by the transportation charges you will pay if you elect to return your kit to the Heath Company.

Heathkit dealers will honor the regular 90 day Heathkit Parts Warranty on all kits, whether purchased through a dealer or directly from Heath Company. It will be necessary that you verify the purchase date of your kit by presenting your copy of the Heath Company invoice to the authorized dealer involved.

Under the conditions specified in the Warranty, replacement parts are supplied without charge; however, if your local dealer assists you in locating a defective part (or parts) in your Heathkit, or installs a replacement part for you, he may charge you for this service.

Heathkits purchased locally and returned to Heath Company for service must be accompanied by your copy of the dated sales receipt from your authorized Heathkit dealer in order to be eligible for parts replacement under the terms of the Warranty.

THESE SERVICE POLICIES APPLY ONLY TO COMPLETED INSTRUMENTS CONSTRUCTED IN ACCORDANCE WITH THE INSTRUCTIONS AS STATED IN THE MANUAL. Instruments that are not entirely completed or instruments that are modified in design will not be accepted for repair. Instruments showing evidence of acid core solder or paste fluxes will be returned NOT repaired.

For information regarding modifications of Heathkits for special applications, it is suggested that you refer to any one or more of the many publications that are available on all phases of electronics. They can be obtained at or through your local library, as well as at most electronic outlet stores. Although the Heath Company welcomes all comments and suggestions, it would be impossible to design, test, evaluate and assume responsibility for proposed circuit changes for specific purposes. Therefore, such modifications must be made at the discretion of the kit builder, according to information which will be much more readily available from some local source.

REPLACEMENTS

Material supplied with Heathkits has been carefully selected to meet design requirements and ordinarily will fulfill its function without difficulty. Occasionally improper instrument operation can be traced to a faulty tube or component. Should inspection reveal the necessity for replacement, write to the Heath Company and supply all of the following information:

- Thoroughly identify the part in question by using the part number and description found in the manual Parts List.
- Identify the type and model number of kit in which it is used.
- Mention the order number and date of purchase.
- Describe the nature of defect or reason for requesting replacement.

The Heath Company will promptly supply the necessary replacement. Please do not return the original component until specifically requested to do so. Do not dismantle the component in question as this will void the guarantee. If tubes are to be returned, pack them carefully to prevent breakage in shipment as broken tubes are not eligible for replacement. This replacement policy does not cover the free replacement of parts that may have been broken or damaged through carelessness on the part of the kit builder.

SHIPPING INSTRUCTIONS

In the event that your instrument must be returned for service, these instructions should be carefully followed.

ATTACH A TAG TO THE INSTRUMENT BEARING YOUR NAME, COMPLETE ADDRESS, INVOICE NUMBER ON WHICH THE INSTRUMENT WAS PURCHASED, AND A BRIEF DESCRIPTION OF THE DIFFICULTY ENCOUNTERED. Wrap the instrument in heavy paper, exercising care to prevent damage. Place the wrapped instrument in a stout carton of such size that at least three inches of shredded paper, excelsior, or other resilient packing material can be placed between all sides of the instrument and the carton. Close and seal the carton with gummed paper tape, or alternatively, tie securely with stout cord. Clearly print the address on the carton as follows:

TO:
HEATH COMPANY
Benton Harbor, Mich.

Include your name and return address on the outside of the carton. Preferably affix one or more "Fragile" or "Handle With Care" labels to the carton, or otherwise so mark with a crayon of bright color. Ship by parcel post or prepaid express; note that a carrier cannot be held responsible for damage in transit, if in HIS OPINION, the article is inadequately packed for shipment. Your instrument will be returned by express collect.

SPECIFICATION CHANGES

All prices are subject to change without notice. The Heath Company reserves the right to discontinue instruments and to change specifications at any time without incurring any obligation to incorporate new features in instruments previously sold.

WARRANTY

Heath Company warrants that for a period of three months from the date of shipment, all Heathkit parts shall be free of defects in materials and workmanship under normal use and service and that in fulfillment of any breach of such warranty, Heath Company shall replace such defective parts upon the return of the same to its factory. The foregoing warranty shall apply only to the original buyer, and is and shall be in lieu of all other warranties, whether express or implied and of all other obligations or liabilities on the part of Heath Company and in no event shall Heath Company be held responsible for any anticipated profits, consequential damages, loss of time or other losses incurred by the buyer. This warranty does not cover any damage to the purchaser's equipment or components thereof. No replacement shall be made of parts damaged by the buyer in the course of handling or assembling Heathkit equipment.

NOTE: The foregoing warranty is completely void and we will not replace, repair or service instruments or parts thereof in which acid core solder or paste fluxes have been used.

HEATH COMPANY

PARTS LIST

PART No.	PARTS Per Kit	DESCRIPTION	PART No.	PARTS Per Kit	DESCRIPTION
Resistors-Capacitors					
1-16	1	4.7 K Ω 1/2 watt	73-3	1	Hardware-Miscellaneous
21-16	5	.01 μ fd disc ceramic	204-9	4	1/2" grommet
21-44	1	.005 μ fd \pm 20% 1.6 kv disc	250-2	2	Angle bracket
23-56	1	.5 μ fd 200 volt tubular	250-7	4	3-48 screw
23-16	1	20 μ fd 350 volt electrolytic	250-9	2	6-32 x 3/16" screw
Chokes-Transformer					
45-4	1	1.1 mh RF choke	250-18	2	6-32 x 3/8" screw
45-20	1	"A" choke	250-26	2	8-32 x 3/8" screw
55-2	1	Vibrator transformer	250-56	4	6-32 x 1/4" BH screw
Vibrator-Tube					
66-2	1	Vibrator, 12 volt	252-1	2	3-48 nut
411-92	1	12X4 tube	252-3	6	6-32 nut
Wire-Sleeving					
344-2	1	length #18 hookup wire	252-4	2	8-32 nut
340-2	1	length Bare wire	254-1	6	#6 lockwasher
346-1	1	length Sleeveing	254-3	1	#8 lockwasher
Sockets-Terminal Strips-Sheet Metal Parts					
431-11	1	5-lug terminal strip	254-7	2	#3 lockwasher
431-13	1	4-screw lug terminal strip	259-2	1	#8 solder lug
434-15	1	7-pin miniature socket	390-24	1	Adhesive label
434-27	1	4-pin water socket	595-149	1	Instruction manual
100-M248	1	Chassis base			
200-M101	1	Chassis top			
207-6	1	Vibrator ground clamp			

